Remarks

Applicants respectfully request reconsideration of this application as amended herein.

Applicants submit herewith, for the Examiner's approval, copies of the drawings in this application that have been marked to show the proposed changes required by the Examiner. The changes to the formal drawings will be made and new drawings submitted to the Official Draftsperson for entry in this Application upon approval by the Examiner.

Claim 16 has been amended to correct an obvious error in the dependency.

Claims 1-6 and 10-20 have been rejected under 35 USC 112, first paragraph, as containing subject matter which is not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The Examiner asserts that the specification must describe fully the exact composition of the E-glass and the carbon fiber/epoxy. Applicants believe that the exact composition of E-glass and carbon fiber/epoxy is not needed to make and use the invention since the variables of the various available compositions of these materials differ from each other in ways that are insignificant in the context of the invention, and any variability in these properties is fully accounted for in the expressions that relate the mechanical properties of the materials. The modulus of elasticity and density of the various materials can be ascertained from the manufacturer and applied to the disclosed and claimed expressions to ensure that the flywheel under consideration is within the scope of the invention.

The Examiner questions "how a Poisson's Ratio can cause the teeth to be compressed under centrifugal load as recited in claim 18." As the Examiner correctly states, all solid materials have a Poisson's Ration associated with them, since it is merely the ratio of transverse dimensional change to elongation or compression when subjected to tensile or compressive stress. In claim 18, which is dependent on claims 17, 16 and 15, the invention is expressed as a widening of the teeth under compression due to centrifugal loading and a tightening of the connection between the liner teeth and

the hub, and this widening of the teeth is explained as a function of the Poisson's Ratio of the liner material.

The Examiner asks how the strain-to-failure capability of greater than 4% is produced. All solid materials have a strain-to-failure characteristic associated with them. Applicants' invention as set forth in claim 14 limits the scope of the invention as defined in that particular claim to a rim liner that has a strain-to-failure of greater than 4%. This is primarily a characteristic of the material from which the rim liner is made. Applicant disclosed several examples of such materials in a rim liner structure as disclosed.

Claims 10-20 have been rejected under 35 USC 112, second paragraph, as indefinite, on the ground that the term "high speed" is undefined in the claim, and "the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention." Applicants respectfully assert that the term "high speed" is adequately defined in the specification as the speed above which the flywheel rim would begin to decouple from a flywheel hub in the absence of a rim-to-hub coupling that accommodates the radial growth of the rim. For example, the first paragraph of the specification states:

> "This invention pertains to a hub-to-rim coupling system for high speed composite flywheels, and more particularly to a flywheel hub-to-rim coupling that accommodates radial growth of the flywheel rim in operation without decoupling from the hub."

The specification on page 2 states:

> "The prior methods for designing hubs that can handle both the large radial growth of the inside diameter of the composite rim and the high centrifugal loads generated from high speed rotation can be classified into two categories: strain matching and sliding joint hubs."

The specification is replete with other examples explaining the context of the term "high speed" which would make clear to those skill in the art "high speed" in this application means the speed at which separation of the rim from the hub could occur

due to radial strain induced by centrifugal loading. Thus, Applicants believe there would be no doubt about the meaning of the term.

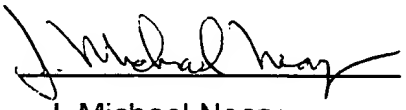
The term "high speed" would be different for different flywheel designs, hence it could not be defined in absolute numbers because it would likely create a basis for argument by infringers that the claims should be limited to some particular arbitrary flywheel RPM speed, which is not the intention of this application. The speed will be different for different flywheel designs because rim growth will be different for the different designs and materials.

Claim 10 has been rejected under 35 USC 112 as indefinite in the ground that the antecedent of "said liner" in lines 3-4 is uncertain, since there are two "liners" recited in claim 10. Claim 10 has been rewritten to correct this error.

Claims 7 and 8 have been rejected under 35 USC 102 as anticipated by Kundermann. Claim 7 has been amended to specify the characteristics of the rim liner that provide the benefits of allowing growth of the rim liner to maintain compressive contact with the rim throughout the full speed range of the flywheel. There is no such teaching in Kundermann, so claim 7 and its dependent claim 8 should now be allowable.

Applicants believe that the claims now pending in this application are patentable for the reasons set forth above and solicits the Examiner's reconsideration of these claims in light of these reasons. If the Examiner, in his independent judgement, concurs with Applicant's opinion, he is respectfully requested to pass this application to issue.

Respectfully submitted,



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Appendix Showing Changes to the Claims

7. (Amended) A hub for a high speed flywheel system, comprising:

a flywheel hub having radial splines;

a flywheel rim liner having radial projections mating with said splines to form a torque transmitting coupling between said hub and said liner that maintains concentricity between said hub and said rim liner;

said flywheel rim liner made of a material having a strain-to-failure capability and a ratio R_l equal to E_l/ρ_l, wherein E_l is a hoop modulus of elasticity of said rim liner and ρ_l is the density of said rim liner material;

said rim liner strain-to-failure capability and ratio R_l being such that said rim liner remains in compressive contact with said rim from start to maximum speed of said flywheel system.

10. (Amended) A process of coupling a flywheel rim to a flywheel hub, comprising:

mounting said rim on a rim liner; and

coupling said rim liner to said hub with a torque coupling [liner] that allows said liner to grow radially with respect to said hub while remaining concentric thereto during high speed operation.

16. (Amended) A flywheel system as defined in claim [17] 15, wherein:

said coupling includes an array of radial projections spaced angularly around said liner extending into radial grooves in said hub.